

**REALISTIC<sup>®</sup>**

# Service Manual

42-2976

## LAB-440 FULLY AUTOMATIC DIRECT DRIVE TURNTABLE

Catalog Number: 42-2976



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

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# 1. SPECIFICATIONS

General	NOMINAL	LIMIT
Type .....	2 speed, direct drive, auto-in, auto-return system	
Platter .....	Aluminum alloy die-cast, 310 mm outer diameter, weight 0.65kg.	
Motor .....	DC servo-type	
Speed .....	33-1/3 rpm and 45 rpm	
Pitch control range .....	±4.5%	
Speed change system .....	Electronic change-over system	
S/N(DIN-B) .....	Better than 70 dB	.65 dB
Wow & Flutter (WRMS) .....	Less than 0.035%	0.055 %
Hum .....	.65 dB	.55 dB
Rumble .....	.65 dB (DIN-B).	.55 dB
Tone arm .....	Static-balance type, tubular	
Head shell .....	Plug-in type	
Overall length .....	302 mm	
Effective length .....	215 mm	
Overhang .....	16 mm	
Adjustable force range .....	0 to 3g/1 turn of the scale ring	
Acceptable cartridge weight .....	.4 to 7g	
Cartridge .....	Realistic/Shure Model R-1000EDT	
Frequency response .....	20-20,000 Hz	
Channel difference at 1 kHz .....	.2 dB	.2.5 dB
Channel separation at 1 kHz .....	.23 dB	.18 dB
Output voltage at 1kHz 50mm/sec .....	.5mV	.2.5mV
Tracking force .....	1 ~ 1-1/4 grams	
Stylus tip .....	0.2 x 0.7 mil elliptical diamond stylus	
Power source		
U.S.A./Canada .....	120V 60 Hz	
Europe .....	230V 50 Hz	
Australia/U.K. ....	240V 50 Hz	
Power consumption .....	8 watts	
Dimensions .....	5-1/8(H) x 16-17/32(W) x 1409/16(D) Inches. (130(H) x 420(W) x 370(D) mm)	
Weight .....	15.43 lbs. (7 kg.)	
Accessories .....	Overhang Gauge 45 RPM adaptor	

**NOTE:** Nominal Specs represent the design specs; all units should be able to approximate these — some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any Limit Spec.

**Lubrication of the mechanism is not required.** However, whenever a unit is brought in for adjustment or repair, always use good common sense - - clean any dust or dirt from mechanical parts and if moving parts do seem to bind, check for dirt and if necessary, add a very fine film of light-weight specially formulated lubricant.

## 2. DISASSEMBLY INSTRUCTIONS

### 1. Bottom Board Removal (Figure 1)

- (1) Remove Dust Cover, Turntable sheet and Turntable. Lock the Pickup Arm and turn over the Unit.
- (2) Remove six screws (A) from the Bottom Board and Lift it up.

(3) Remove screws (E) and (F)s.

(4) Detach the connector (G) and remove wire clamps (H) and (I).

(5) Remove Hexagon Nuts (J) and screws (K), and the Chassis Assembly can be turned over.

### 2. Chassis Assembly Removal (Figure 2)

- (1) Remove the Bottom Board.
- (2) Remove two screws (B) and detach two connecting rods (C) and (D).

### 3. Motor Removal (Figure 2)

- (1) Remove five screws (L) and pull up the Motor.

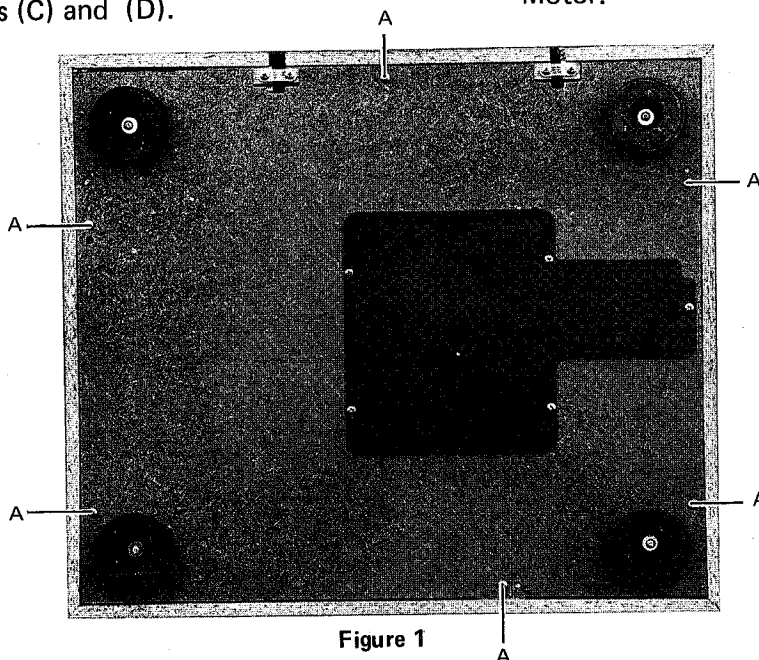


Figure 1

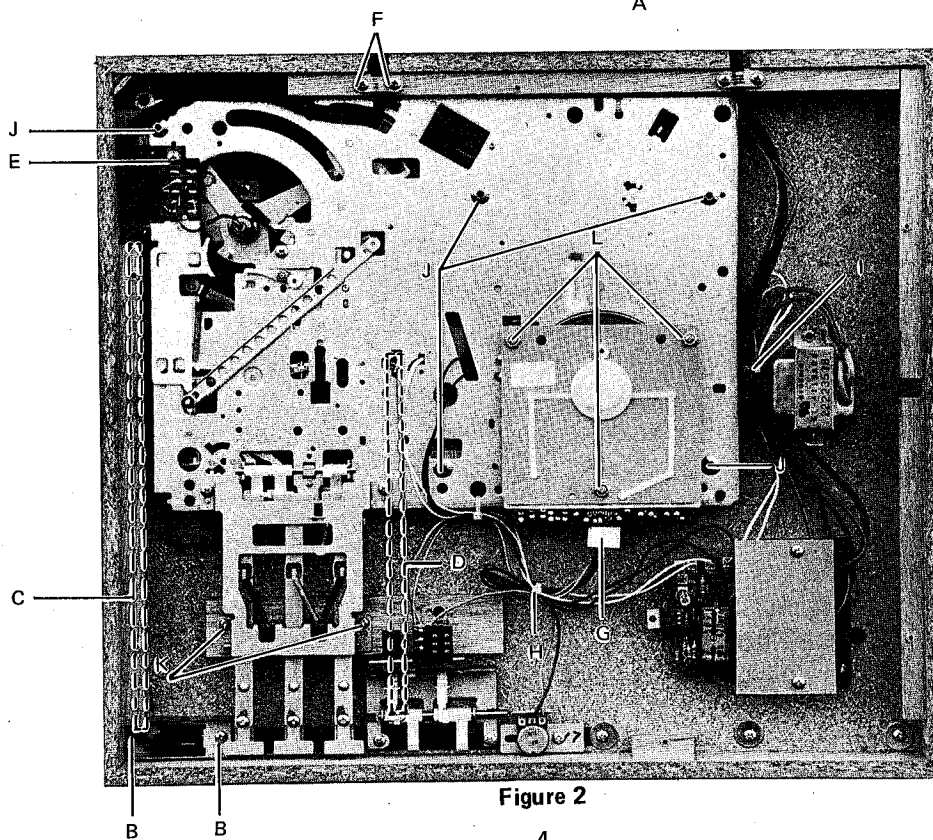


Figure 2

### 3. ATTACHMENT AND CONNECTIONS OF CARTRIDGE

Perform installation or replacement of the Cartridge as follows.

- (1) Attach the Cartridge to the Headshell with screws.
- (2) The polarities and L/R channels wirings are shown in Figure 3.
- (3) Make connections to the Cartridge following instructions provided with the Cartridge.

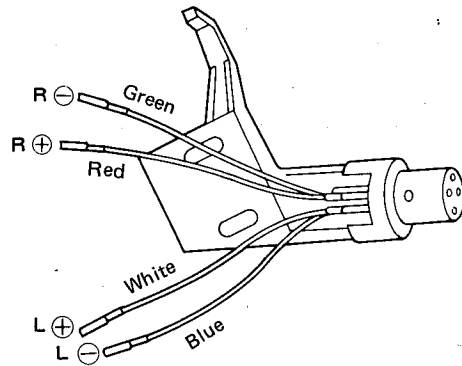


Figure 3

### 4. ADJUSTMENT INSTRUCTIONS

#### 1. Overhang adjustment

- (1) Adjust the overhang when the Cartridge is mounted. The overhang should be 16 mm. Adjust it by sliding the Cartridge back and forth after loosening the Cartridge mounting screws.
- (2) Tighten the Cartridge mounting screws after the adjustment.

#### 2. Tracking force adjustment

Adjust the tracking force to the recommended value as below.

- (1) Turn the Counter Weight until the Pickup Arm is balanced freely in horizontal plane.
- (2) Slip the Tracking Force Dial only to opposite the "O" on the Dial to the Line on the Arm Shaft. (Figure 5)
- (3) Turn the Counter Weight with the Tracking Force Dial counter-clockwise for the recommended value. (Figure 6)

#### 3. Anti-skating force adjustment

Match the Anti-skating Dial to the Tracking Force Dial reading above.

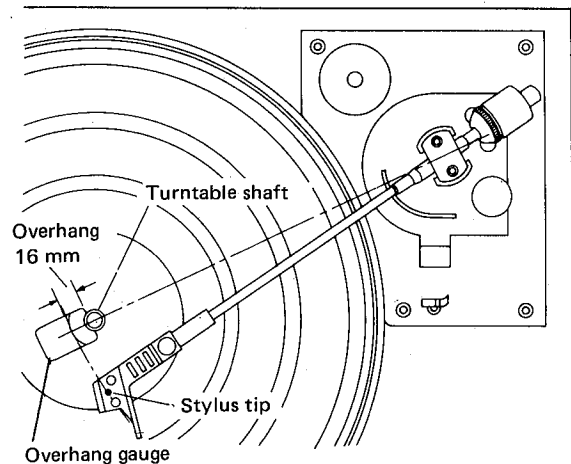


Figure 4

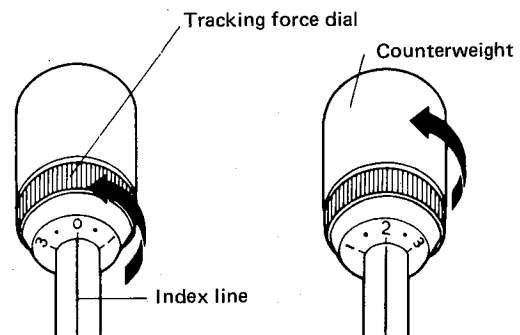


Figure 5

Figure 6

#### 4. Cueing Height Adjustment

To adjust the height of the stylus tip when using the cueing facility, turn the adjusting screw (G) clockwise or counter-clockwise to adjust the distance between the stylus tip and face of a record disc on the Turntable to be 6 mm. (Figure 7)

#### 5. Automatic Mechanism Adjustment (Figure 7)

There are two rubber covers on the base of Pickup Arm. Remove these covers and set the Arm on the rest.

##### Set-down Position (Screw B)

Turn the screw B counter-clockwise to set down closer to the center. Turn clockwise to set down closer to the edge of the disc.

##### Return Position (Screw A)

Turn the screw A clockwise to cause the Pickup Arm to lift later. Turn counter-clockwise to cause the Pickup Arm to lift sooner. After adjustment, replace the covers.

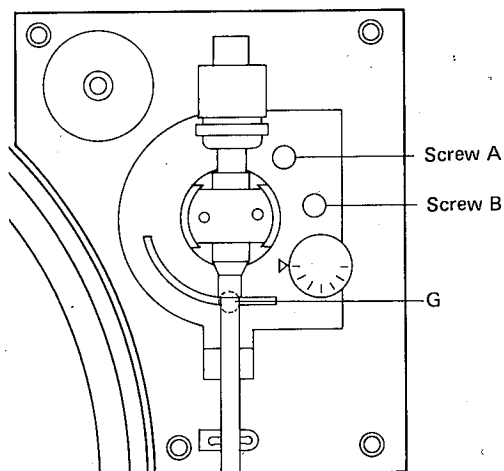


Figure 7

#### 6. Speed Adjustment

When the pattern of the Stroboscope cannot be fixed with the Pitch control knob, adjust the semi-fixed resistor on the motor.

(Figure 8)

- (1) Remove the bottom cover.
- (2) Set the Pitch control knob to the center position. Set the Speed select button to 33 or 45.
- (3) Adjust to fix the pattern with the semi-fixed resistor as below.  
SVR 1 for 33 rpm.  
SVR 2 for 45 rpm.

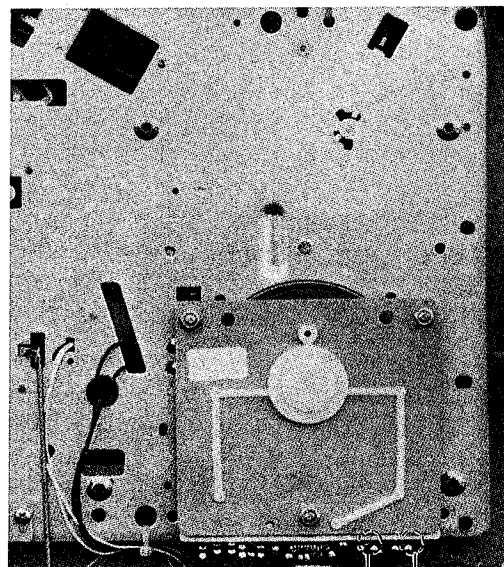


Figure 8

SVR2  
45rpm

SVR1  
33rpm

## 5. EXPLANATION OF MECHANISM

### 1. General

- (1) The Micro Switch (S101) turns DC Motor on and off. The Proximity Switch (S102) turns the current of solenoid on and off.
- (2) The right swing of Repeat Cam (15) slides down Lead-in Slider (14) and turns the Lever for Micro Switch (28) to left.
- (3) Pin (A) on the Pickup Plate Assembly pushes Lock Lever for Micro Switch (29) to release Lever for Micro Switch (28). Pin (B) carries out the Pickup Arm Assembly fixed to Pickup Plate Assembly at that pivot. (Figure 9)

### 2. Before Starting

- (1) Click Stopper (38) stops turning of Return Cam (15) to right.
- (2) Lever for Micro Switch (28) stays loose from Micro Switch (S101) to turn the Switch off to stop DC Motor (M1). (Figure 9)

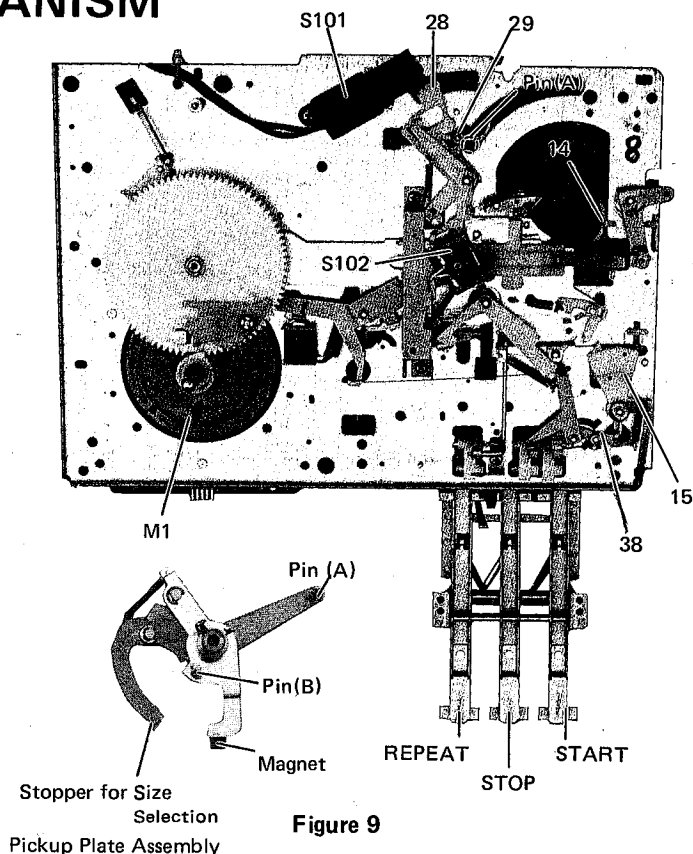


Figure 9

### 3. Auto-in

- (1) When the START button is pushed, Click Stopper (38) releases Repeat Cam (15) to swing right to slide down Lead-in Slider (14) and to turn the Lever (28) to left. Micro Switch (S101) turns on DC Motor (M1).
- (2) Pushing of the START Button pulls Spring for Relay-cut Lever to push out Auto Clutch (11) and turns Main Gear (10) by the torque of DC Motor (M1). (Figure 10)
- (3) Rotation of Main Gear (10) slides Return Lever (2) to right. The lower hand of Lead-in Slider (14) scoops up Lead-in Click for Return Lever (5) at the right side of Pin (B). (Figure 11)

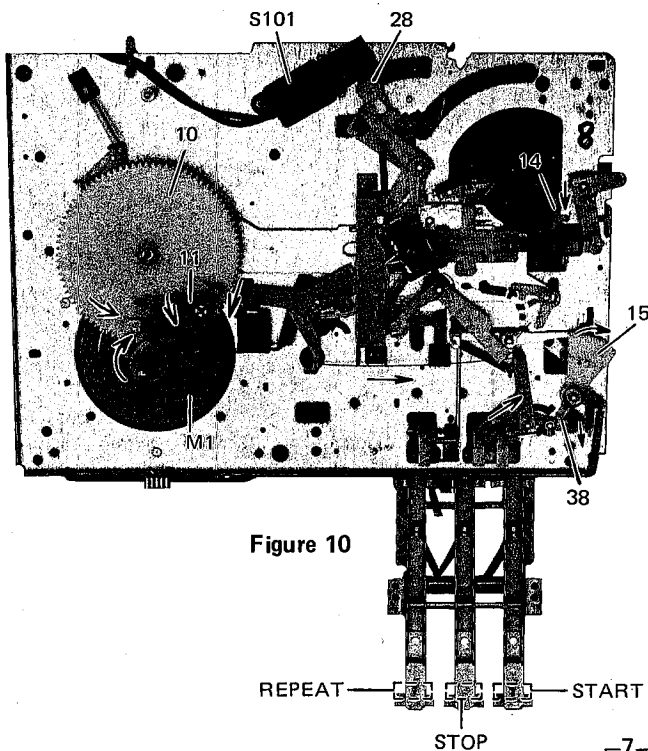


Figure 10

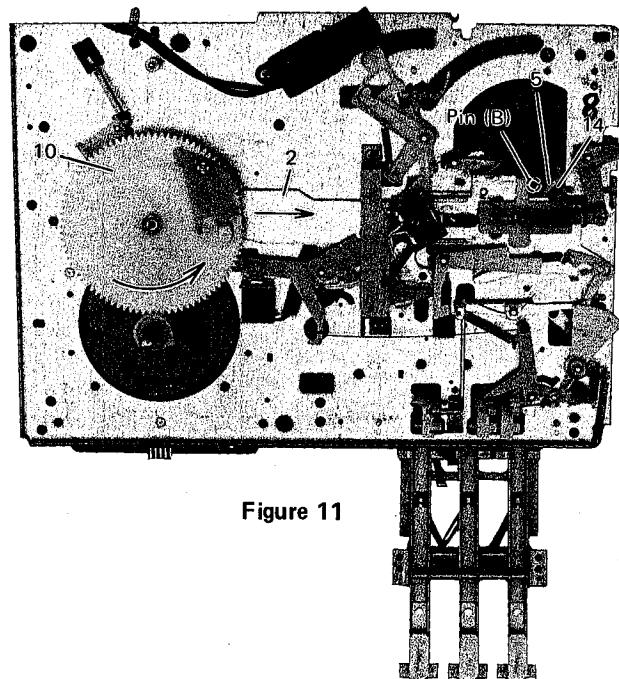


Figure 11

- (4) With the rotation of Main Gear (10), Return Lever (2) returns to left, carrying out the Pickup Arm. (Figure 12)
- (5) While carrying the Pickup Arm, Size-select Cam (36) stops the rotation of the Pickup Plate Assembly at 33 or 45 rpm point with the Stopper for size selection. Lead-in Click (5) falls down to free Pin (B.) (Figure 13)
- (6) Main Gear (10) continues rotation and slides back Return Lever (2), returning Repeat Cam (15) with Repeat Click for Return Lever (6) and stopping at non-g geared position of Main Gear (10). Record playing starts. (Figure 14)

#### 4. Auto-out

- (1) When the Stylus comes to final groove of the record disc, the Magnet on the Pickup Plate Assembly comes closer to Proximity Switch (S102) and turns it on.
- (2) The Solenoid pulls Reject Lever (33) to push out Auto Clutch (11). (Figure 14)
- (3) Main Gear (10) starts turning and slides back Return Lever Assembly (2) to right to push back Pin (B) on the Pickup Plate Assembly at the upper boss of Return Lever (2). Pickup Arm returns to the Stand and Lead-in Slider (14) returns up. (Figure 15)

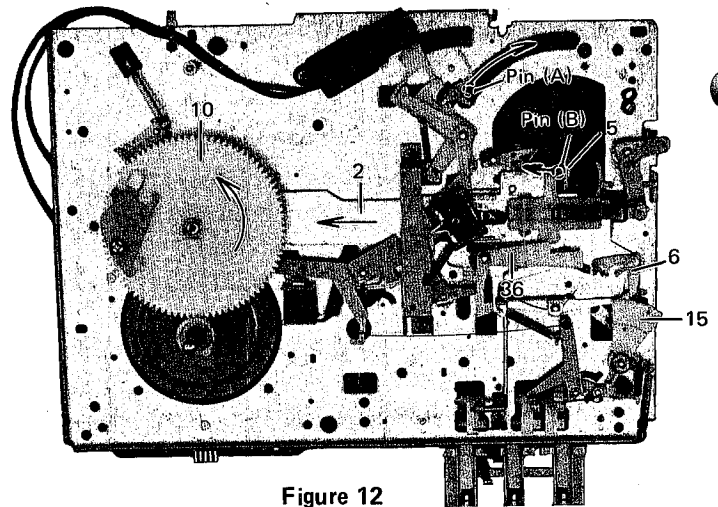


Figure 12

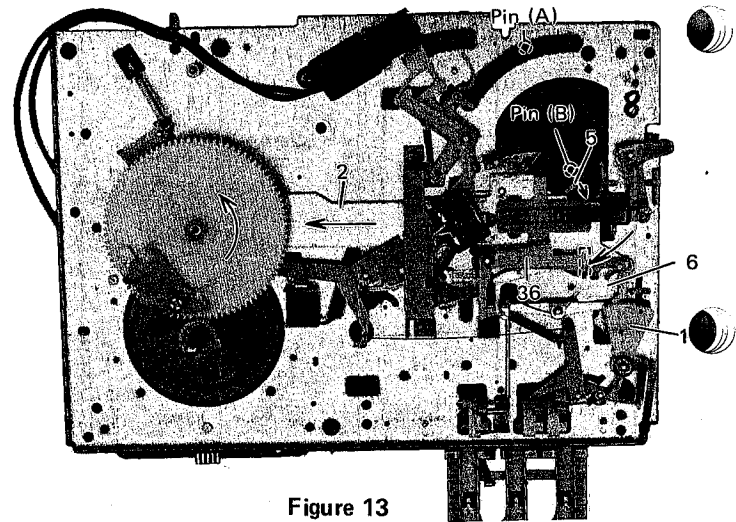


Figure 13

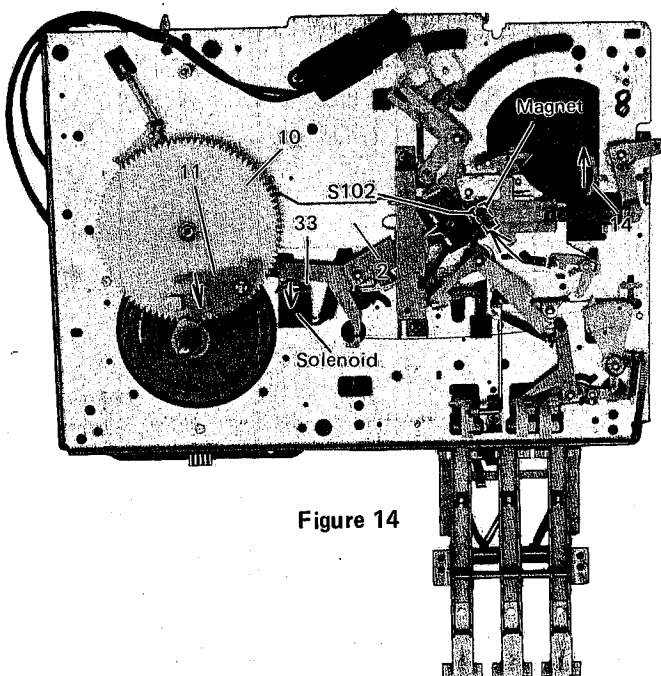


Figure 14

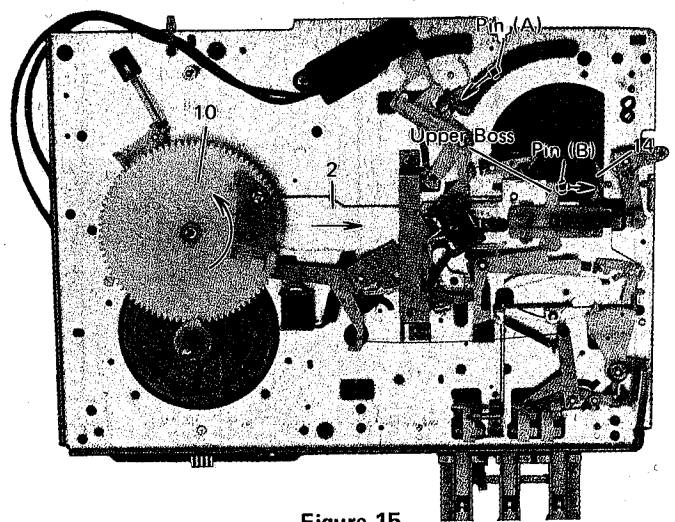


Figure 15



- (4) When Pickup Arm returns to the Stand, Pin (A) on the Pickup plate Assembly pushes Lock Lever for Micro Switch (29) to return Lever (28) and Micro Switch (S101) turns off to stop DC Motor (M1).

Now it brings back the mechanism to prior starting condition. (Figure 16)

#### 5. Manual Cut

When the STOP button is pushed while playing, Relay-cut Lever (18) pulls Reject Lever (33) to push out Auto Clutch (11) and Pickup Arm returns in same action as Auto-out. (Figure 17)

#### 6. Repeat Playing

- (1) Pushing the REPEAT button, slides down Lead-in Slider (14) to scoop up Lead-in Click (5) and in this condition, Lever for Micro Switch (28) pushes Micro Switch (S101) to switch on when the START button is pushed. So Lead-in Click (5) is scooped up at every sliding to right direction of Return Lever Assembly (2) and carries out the Pickup Arm to starting point of the record disc. (Figure 18)
- (2) To stop repeat playing, push the STOP button to return up Lead-in Slider (14). So Lead-in Click for Return Lever (5) is not scooped up and leaves the Pickup Arm on the Pickup Stand in the returning cycle of Return Lever Assembly (2).
- (3) At the finish of returning cycle of Lever (2), Lever for Micro Switch (28) is returned to turn off Micro Switch (S101) and stops turntable.

#### 7. Manual Play

- (1) When the Pickup Arm is moved to the starting groove of the disc, Pin (A) on Pickup Plate Assembly release Lock Lever for Micro Switch (29). Lever for Micro Switch (28) pushes Micro Switch (S101), and DC Motor (M1) starts rotation.
- (2) If the START button is pushed while manual playing, the mechanism plays Auto-in action.

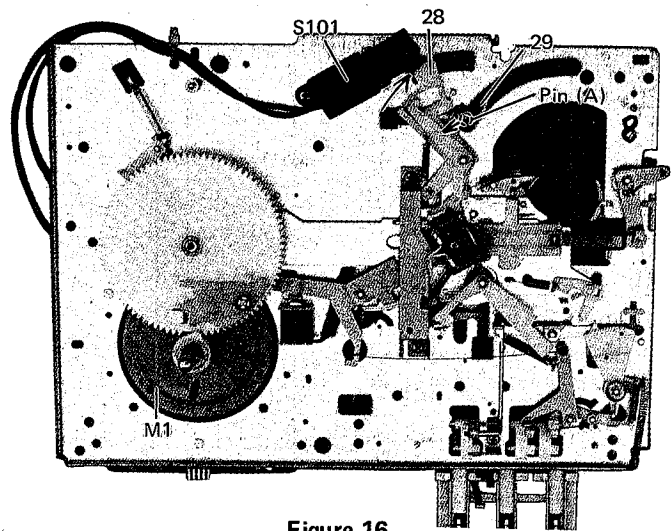


Figure 16

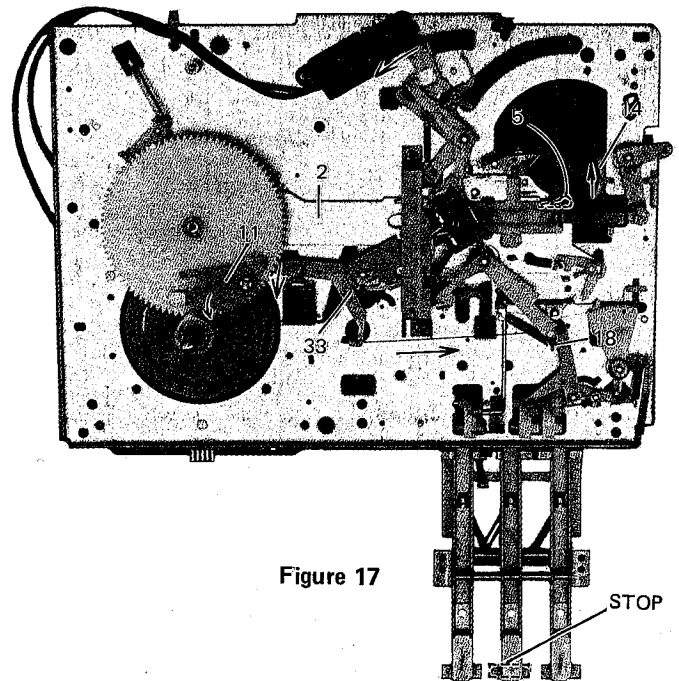


Figure 17

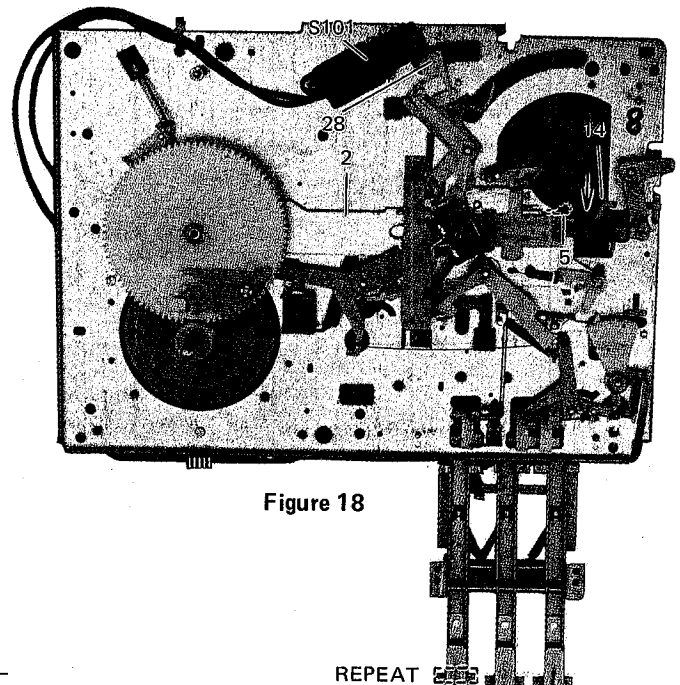


Figure 18

## 6. TROUBLESHOOTING GUIDE

Trouble	Cause	Remedy
<b>Motor</b>		
Motor does not rotate.	<ol style="list-style-type: none"> <li>1. No power to Motor.</li> <li>2. Damaged Motor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check leads of Power Circuit, Motor and Switch.</li> <li>2. Replace Motor.</li> </ol>
<b>CAUTION:</b> The Motor Assembly is precisely assembled and adjusted at the factory. An entire Motor should be replaced if there is a defective Motor Assembly.		
<b>Tone Arm</b>		
Stylus causes jumping or improper tracking.	<ol style="list-style-type: none"> <li>1. Stylus pressure too light.</li> <li>2. Stylus worn out or damaged.</li> <li>3. External vibration.</li> <li>4. Cartridge case touches the surface of record.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust for specified pressure.</li> <li>2. Replace Stylus.</li> <li>3. Install the player where there is no vibration.</li> <li>4. Excessive Stylus pressure. Adjust for specified value.</li> </ol>
<b>Sound</b>		
No sound, or only from one channel.	<ol style="list-style-type: none"> <li>1. Cartridge circuit open.</li> <li>2. Improper connection of Headshell and Tone Arm.</li> <li>3. Open lead between Headshell and Output Cord or mis-wiring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace Cartridge. Replace leads.</li> <li>2. Correct the connection. Check that the connection is free from oil, dust etc. and clean.</li> <li>3. Replace the lead (if the Tone Arm lead is open, replace the Pick-up assembly) or correct wiring.</li> </ol>
Distorted sound.	<ol style="list-style-type: none"> <li>1. Stylus worn out or damaged.</li> <li>2. Cantilever bent.</li> <li>3. Stylus pressure too light or heavy.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace Stylus.</li> <li>2. Replace Stylus.</li> <li>3. Adjust for specified pressure.</li> </ol>
Rumble or wow.	<ol style="list-style-type: none"> <li>1. Motor damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the Motor Assembly.</li> </ol>
Hum.	<ol style="list-style-type: none"> <li>1. Cartridge is affected by electromagnetic field.</li> <li>2. Not grounded.</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep equipment such as motors or transformers away from the Player.</li> <li>2. Connect ground lead to ground terminal of the Amplifier.</li> </ol>
Howling.	<ol style="list-style-type: none"> <li>1. Cartridge picks up vibration or sound pressure from speaker.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install the player on a rigid table or in location where howling is minimized.</li> </ol>
<b>Auto Return/Auto-In</b>		
Will not Return.	<ol style="list-style-type: none"> <li>1. Defective proximity switch.</li> <li>2. Defective solenoid.</li> <li>3. Defective clutch.</li> <li>4. Poor alignment of Auto-return.</li> <li>5. Loose connection of Pickup Plate.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace.</li> <li>2. Replace.</li> <li>3. Replace.</li> <li>4. Align.</li> <li>5. Tighten the set screws on the Pickup Plate.</li> </ol>
Unsuitable auto-in or auto-returning position.	<ol style="list-style-type: none"> <li>1. Poor alignment of adjusting screws.</li> </ol>	<ol style="list-style-type: none"> <li>1. Align. See adjustment section.</li> </ol>

# 7. BOTTOM VIEW OF P.C. BOARD AND WIRING

7-1 FOR U.S.A./CANADA

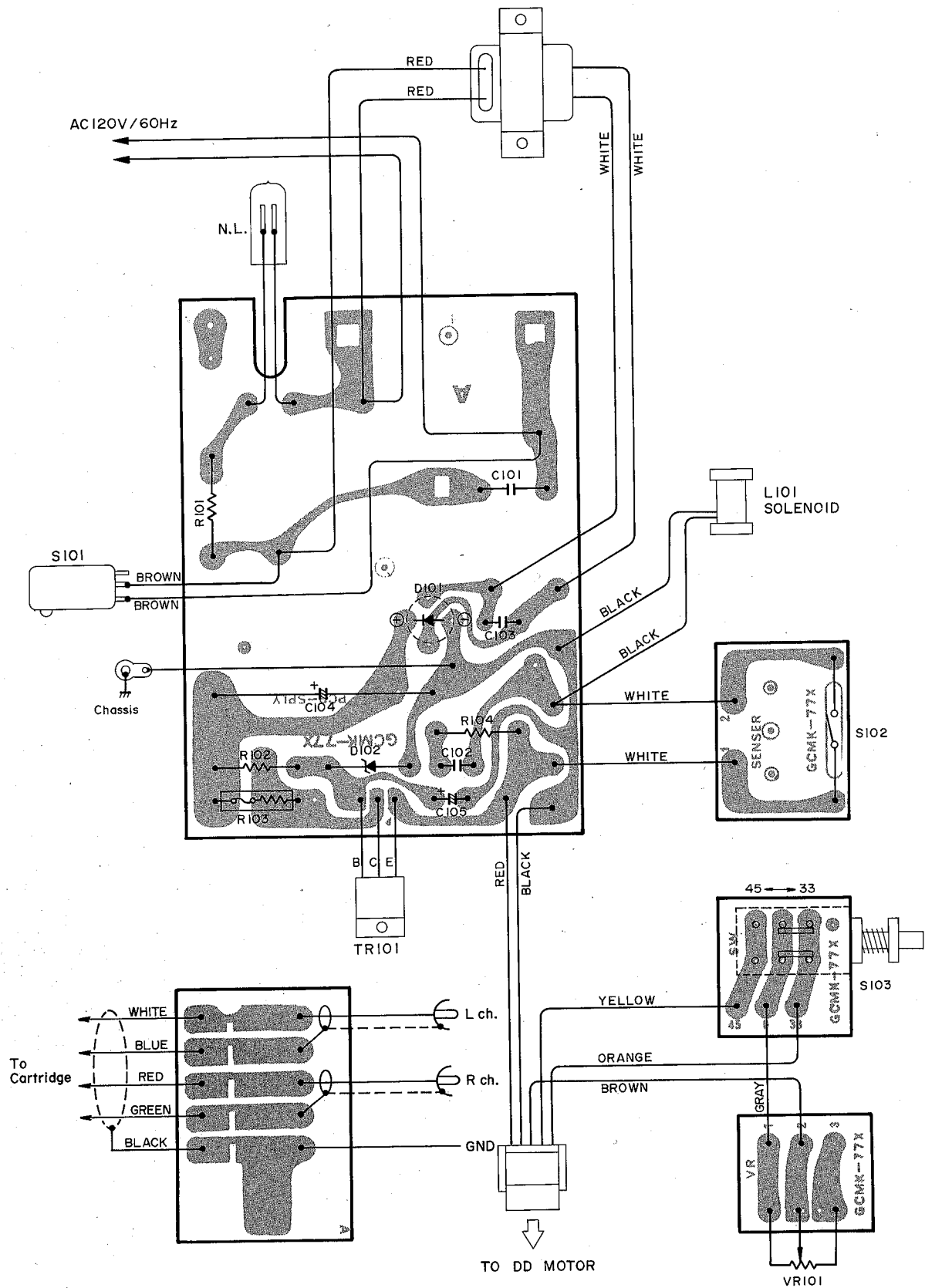


Figure 19

## 7-2 FOR EUROPE/AUSTRALIA

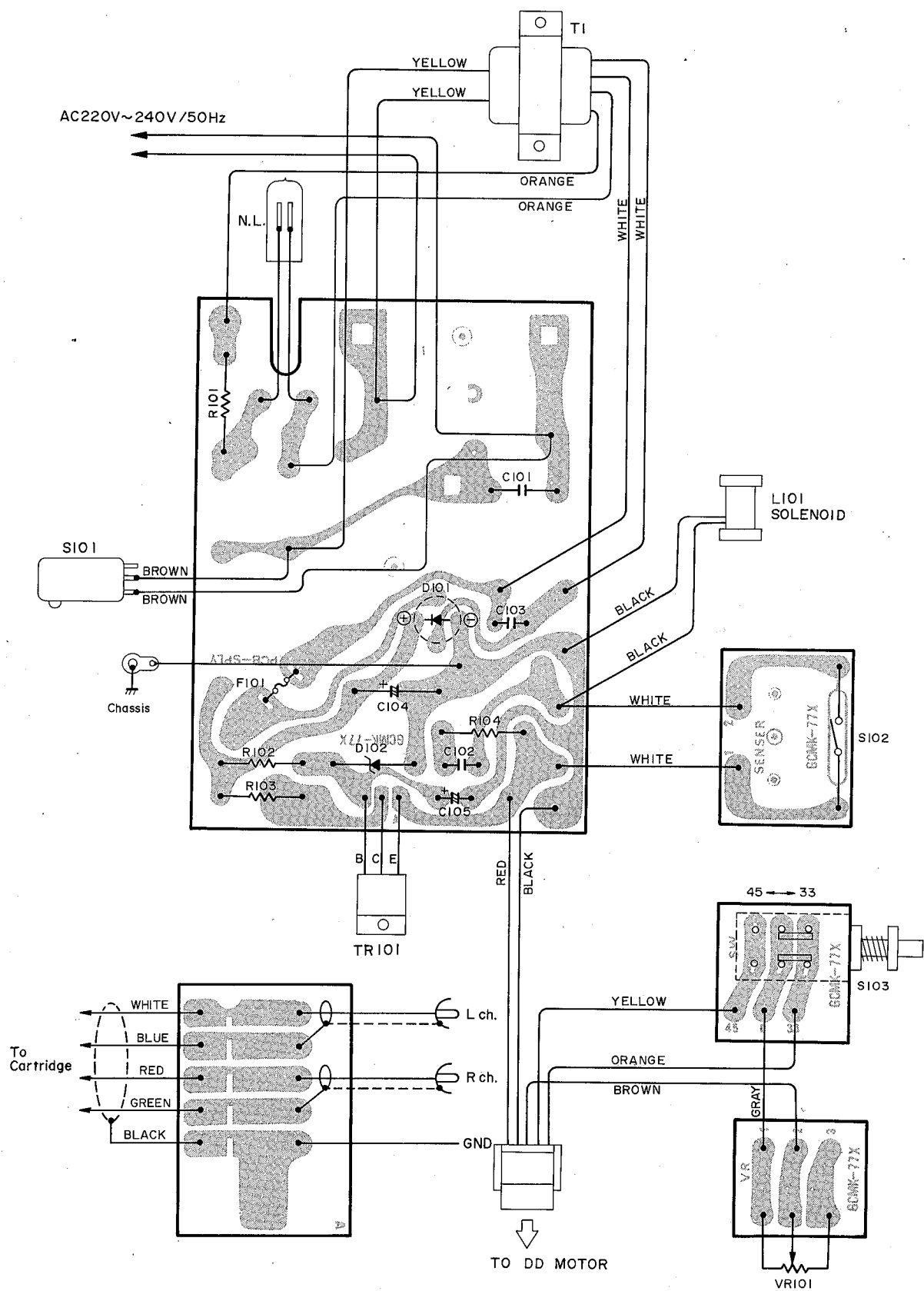


Figure 20

## 8. ELECTRICAL PARTS LIST

TOLERANCE J:  $\pm 5\%$ , K:  $\pm 10\%$ , M:  $\pm 20\%$   
P: +100 - 0%

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
<b>CAPACITORS</b>			
C101	Ceramic Capacitor 0.01 $\mu$ F/125V,M (U.S.A., Canada)		22340157
	Ceramic Capacitor 0.01 $\mu$ F/400V,M (Europe, U.K, Australia)		22340154
C102	Ceramic Capacitor 0.01 $\mu$ F/400V,M		22342103
C103	Ceramic Capacitor 0.01 $\mu$ F/125V,M		22342103
C104	Electrolytic Capacitor 470 $\mu$ F/50W,B (U.S.A., Canada)		22440431
	Electrolytic Capacitor (Europe, U.K, Australia)		92440300
C105	Electrolytic Capacitor 10 $\mu$ F/35W,A		22447100
<b>TRANSISTORS &amp; DIODES</b>			
TR101	Transistor 2SD313-E		22114023
D101	Diode WL02		22115485
D102	Diode WL182		22115332
<b>RESISTORS</b>			
R101	Metal Film Resistor 12K ohm 1W,M (U.S.A., Canada)		22571123
	Metal Film Resistor 8.2K ohm 1W,M (Europe, U.K, Australia)		22571822
R102	Carbon Film Resistor 1.5K ohm $\frac{1}{2}$ W,M		22511152
R103	Fusible Resistor 10 ohm $\frac{1}{4}$ W,J-X (U.S.A., Canada)		22500314
	Metal Film Resistor 3.3 ohm 1W,M (Europe, U.K, Australia)		22571339
R104	Carbon Film Resistor 120 ohm $\frac{1}{2}$ W,M		22511121
VR101	Variable Resistor 16B3K ohm		22622215
<b>SWITCHES</b>			
S101	Micro Switch (U.S.A., Canada)		22140321
	Micro Switch (Europe, U.K., Australia)		22140559
S102	Proximity Switch		22140615
S103	Push Switch (Speed Selector)		22140690

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
<b>TRANSFORMERS</b>			
T1	Power Transformer (U.S.A.) Power Transformer (Canada) Power Transformer (Europe, U.K., Australia)		22223578 22223582 22223583
<b>MISCELLANEOUS</b>			
E1	P.C.Board Assembly, Power Supply (U.S.A., Canada) P.C.Board Assembly, Power Supply (Europe, U.K, Australia)		22138249  22138263
E2	P.C.Board Assembly, Switch		22130402
E3	P.C.Board Assembly, VR		22130403
E4	P.C.Board Assembly, Sensor		22130404
E5	Patch Cord		92164854
E6	Power Cord EP (U.S.A., Canada) Power Cord E2 (Europe, U.K.) Power Cord A2 (Australia)		22176174 22176529 22176599
M1	Motor, DC Electric Governor		22125596
L101	Solenoid		22147236
PL-NE	Neon Lamp 2HH-3 Fuse Holder Fuse 0.4A		22113546 22165047 22144381

## 9. MECHANICAL PARTS LIST

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
<b>CABINET PARTS</b>			
301	Cabinet Assembly		20848662
302	Hinge		20861711
303	Bottom Cover		20826797
304	Foot Assembly		20863628
305	Spring for Front Foot		22776648
306	Spring for Back Foot		22776699
307	Motor Cover		20848681
308	Lamp Cover		20846616
309	Lamp Lens		22833849
310	Dust Cover Assembly		20848659
311	Turn Table		20723737

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
312	Cover Sheet for Cabinet		20848663
313	Push Button for Speed, Stop, Size, Repeat and Start		20874691
314	Cueing Knob		20872656
315	Volume Knob		20872658
316	Pickup Arm Assembly		20731941
317	Head Shell		20731944
318	Counter Weight		20731955
319	Pickup Stand		20735723
320	Anti-Skating Knob		20872657
321	Anti-Skating Stopper		90753310
322	Preload Spring		95779049
323	Anti-Skating Lever		90753309
324	Rubber Cap		20881768
325	Lifter Bar Assembly		20764831
326	Push Spring for Lifter Bar		22776704
327	Lift Shaft		20764798
328	Push Spring for Lift Shaft		22776701
329	Pickup Rest Assembly		20738742
330	Cord Clamp for Power Cord, Patch Cord (U.S.A., Canada)		22184182
	Card Clamp for Power Cord, Patch Cord (Europe, U.K, Australia)		92184117
331	Adapter 45 r.p.m		20971653
	Overhang Gauge		20971685
333	Main Label (U.S.A.)		22867741
	Main Label (Canada)		22865822
	Main Label (Europe, U.K)		22867749
	Main Label (Australia)		22867748
334	Table Sheet (U.S.A.)		20723707
	Table Sheet (Canada, Europe, U.K, Australia)		20723713
335	Label Caution (U.S.A.)		22866819
	Label Caution (Canada)		22866923
	Label Caution (Europe, U.K)		22867720
	Label Caution (Australia)		22866819
336	Panel Front		20713855
<b>MECHANISM PARTS</b>			
1	Sub Panel Assembly		20015873
2	Return Lever Assembly		20754881
3	Lifter Block for Return Lever		90753214
4	Cushion for Return Lever		90746203
5	Lead-in Click for Return Lever		20754874
6	Repeat Click for Return Lever		20754875
7	Push Spring for Return Lever		20703882
8	Spring for Return Lever		95771885
9	Steel Ball 5/32		74090397
10	Main Gear		90727037
11	Auto Clutch for Main Gear		20754873
12	Lifter Lever Assembly		20754867

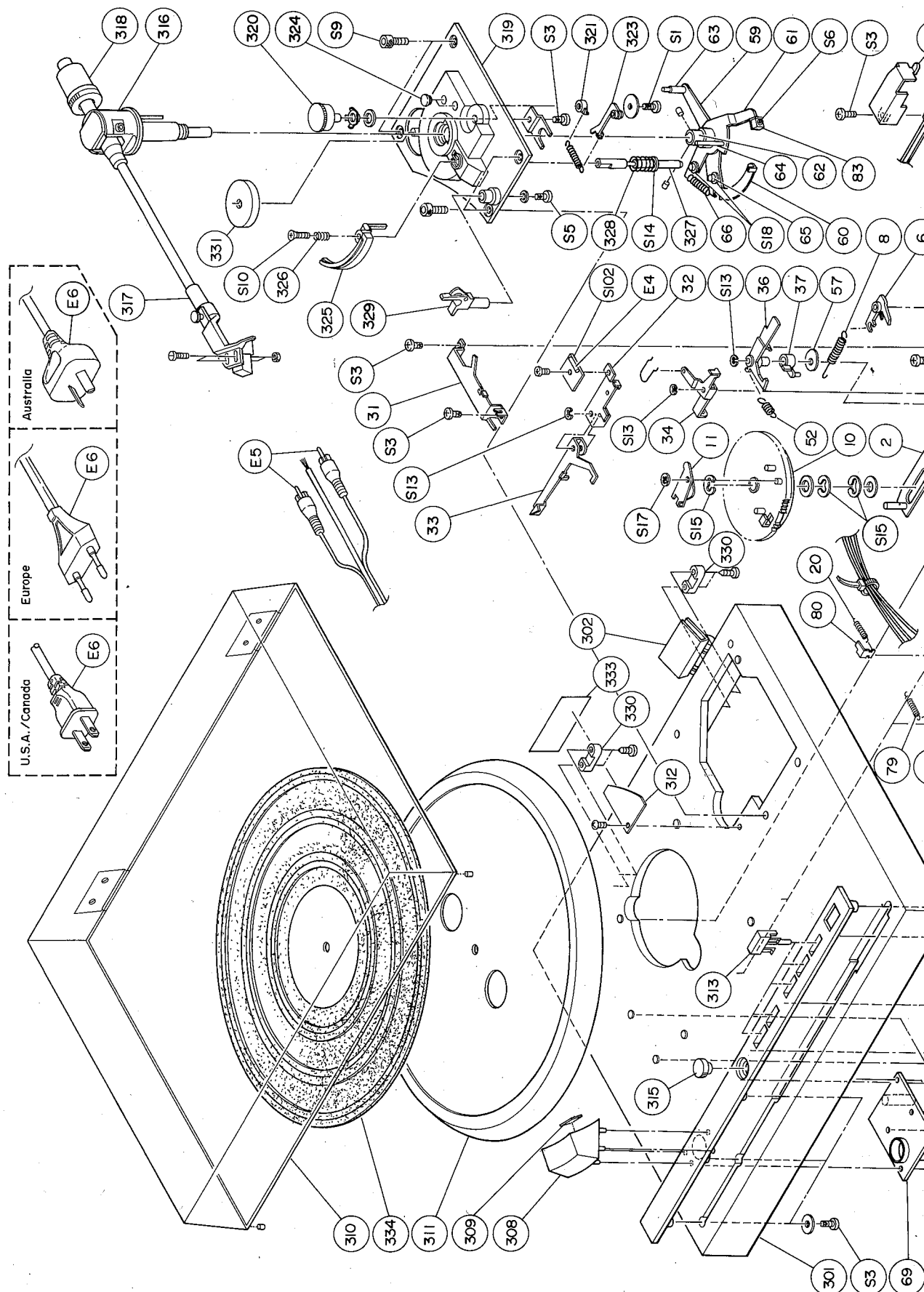
REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
13	Cushion for Arm		95761354
14	Lead-in Slider		90753245
15	Repeat Cam		90753244
16	Start Hook		22870507
17	Cushion for Start Hook		90746270
18	Relay-cut Lever		20754863
19	Bush for Relay-cut Lever		90776093
20	Spring for Relay-cut Lever		90763283
21	Repeat Lever		90753288
22	Spring for Repeat		95773440
23	Repeat Rod		90763286
24	Connect Lever for Repeat, Size, Speed		90753289
25	Shaft for Connect Lever		90763292
26	Shaft Support for Connect Lever		20747649
27	Arm for Micro Switch		90753204
28	Lever for Micro Switch		20754861
29	Link for Micro Switch		20754898
30	Plate Connect		20754872
31	Bracket for Micro Switch		20735726
32	Switch Lever		20754866
33	Reject Lever		20754865
34	Size Lever		20754864
36	Size-select Cam		90753242
37	Lead-in Lever		90753216
38	Click Stopper for Start		20747650
39	Spacer for Return Lever		90746204
40	Brake Lever		90753267
41	Brake Latchet		90753268
42	Rubber for Brake		90753269
43	Latchet Pin		90763266
44	Spring for Latchet		95773401
45	Spring for Brake		95773400
46	Lever for Lock Gear		90753236
47	Return for Guide		90746260
48	Cover for Switch		90746271
49	Spring for Micro Switch		95776104
50	Spring for Lock Lever		22776714
51	Spring for Lead-in Slider		95776168
52	Spring for Size-Select		95776155
53	Pull Spring for Lead-in Select		20705722
54	Pull Spring for Micro Switch		20705723
56	Torsion Spring for Lift Lever		20707787
57	Flat Spring for Size-select		90709021
58	Flat Spring for Repeat Cam		90753323
59	Pickup Plate Base		20754871
60	Lead-in Plate		20754870



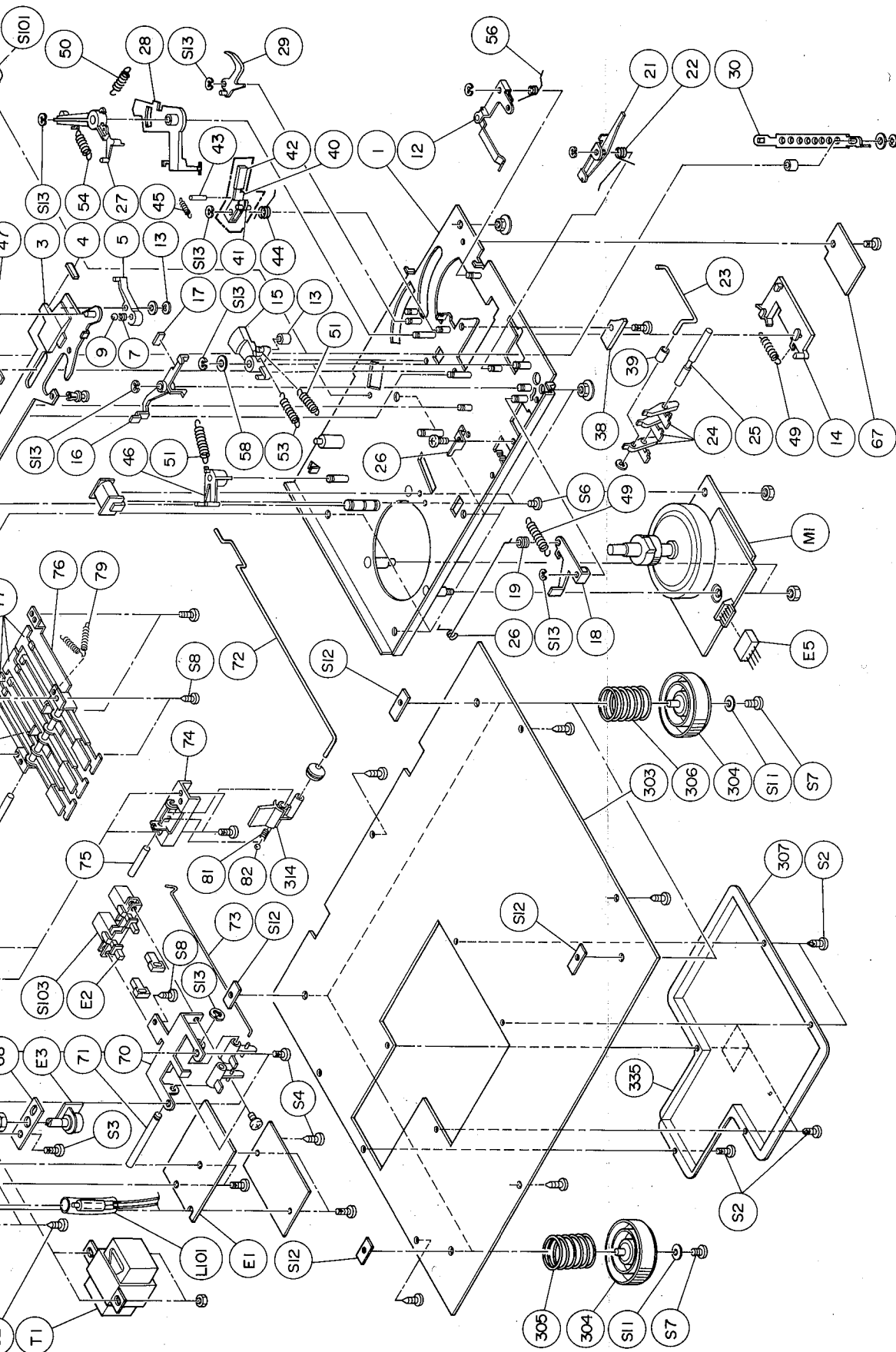
REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
61	Return Plate		20754869
62	Bush for Pickup Plate		20881817
63	Pin for Micro Switch		22746694
64	Pin for Return		20764841
65	Adjust Cam		90757027
66	Spring for Adjust Cam		95776144
67	P.C.Board Lug		22191253
68	Volume Plate		20754879
69	P.C.Board Bracket		20735728
70	Control Bracket		20735725
71	Operate Shaft for Control Bracket		90763284
72	Joint for Cueing		20754877
73	Joint for Size-select		20754876
74	Cueing Bracket		20021787
75	Shaft for Cueing		20764838
76	Operate Bracket		20735727
77	Operate Lever		20754868
78	Operate Shaft		90763284
79	Spring for Operate Bracket		95776102
80	Lock Plate for Operate Bracket		20754880
81	Push Spring for Cueing		22776703
82	Steel Ball for Cueing		74090318
83	Magnet		22755566
SCREWS			
S1	Bind Head Tapping Screw 2 x 10		22701805
S2	Bind Head Tapping Screw 3 x 8		72633008
S3	Bind Head Tapping Screw 3 x 12		72633012
S4	Bind Head Tapping Screw 3 x 8		72633008
S5	Bind Head Tapping Screw 3 x 16		72633016
S6	Bind Head Screw 2.6 x 4		70432604
S7	Bind Head Screw 3 x 14		70433014
S8	Round Head Screw 3.1 x 10		74213110
S9	Hexagon Head Screw 4 x 12 Black		22701635
S10	Flat Head Screw 2 x 12		22701680
S11	Special Washer 3.2 x MS10		22703553
S12	Speed Nut for Foot		22702503
S13	E Ring 2.0φ		74050020
S14	E Ring 3.1φ		22703575
S15	E Ring 4.0φ		74050040
S16	CS Ring 2.0φ		74060020
S17	CS Ring 3.0φ		74060030
S18	Bow Type E Ring 4.0φ		95735222



# 11. EXPLODED VIEW



Figure





RADIO SHACK  A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102  
CANADA: BARRIE, ONTARIO L4M 4W5

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**TANDY CORPORATION**

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